CONFERENCE OF THE EIGHTEEN-NATION COMMITTEE ON DISARMAMENT

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Statement of the United States Atomic Energy Commission dated 25 January 1968 on Project Gasbuggy

The United States Atomic Energy Commission and other project participants released today the preliminary technical data obtained from Project Gasbuggy. Project Gasbuggy is the first joint government-industry experiment in the AEC's Plowshare Program to develop the peaceful uses of nuclear explosives.

The detonation occurred on December 10, 1967 near Farmington, New Mexico. The limited seismic data analyzed to date indicate that the explosion released approximately 26 kilotons of energy.

The specific objective of Project Gasbuggy is to obtain data to help determine whether nuclear explosives can be used to stimulate production and recovery of natural gas from formations where gas is not presently economically recoverable by conventional means. The experiment is being conducted jointly by the El Paso Natural Gas Company, the Department of the Interior, and the AEC. The technical programme is under the direction of the Lawrence Radiation Laboratory at Livermore, California, operated for the AEC by the University of California. The final results of Project Gasbuggy are not expected to be known for about a year.

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Re-entry drilling was completed on January 10, 1968 and indicates that a chimney of broken rock formed as expected. The top of this chimney is 3,907 feet below the surface of the ground which gives a chimney height of 333 feet. Pre-shot calculations had indicated that a layer of coal, located 334 feet above the explosion point would stop the formation of the chimney at that height. The agreement between calculations and the actual chimney height is considered remarkably good. The fact that the chimney height was so close to that expected gives increased confidence that other pre-shot calculations such as the 78-foot chimney radius may be also approximately correct. Other measurements indicate that the chimney was formed by collapse within a minute after the explosion.

At the time of the explosion the instrumentation designed to measure the extent of fracturing in rock around the chimney indicated that such fractures were formed and extend out to about 440 feet. The pre-shot prediction of the extent of such fracturing was about 390 feet.

The chimney formation and the extent of the fracturing are important since the rate at which natural gas flows into the well is determined by the permeability of the rock and the pressure of the gas within the rock. Thus, the size of the chimney of broken rock and the extent of the fractures extending outward from it, determine the increase in the recoverable gas.

The measurements of gas pressure in the Gasbuggy reservoir prior to detonation revealed a gas pressure of about 1,050 pounds per square inch. The gas pressure, measured after the explosion currently is 833 pounds per square inch at the surface which indicates the pressure in the chimney now to be about 950 pounds per square inch. The lower pressure results from the fact that the explosion created about two million cubic feet of void space between the broken rock in the chimney into which gas can flow. As gas enters the chimney, pressure within the chimney starts to increase and is expected to approach original levels within a few months. One of the objectives of the Gasbuggy experiment is to determine the rate at which gas re-enters the chimney, and this can be measured, in part, by the rate of the pressure increase. This data will be refined further by removing the gas collected in the chimney and again measuring the rate at which gas re-enters the chimney. Such determinations will be part of the continuing post-shot programme.

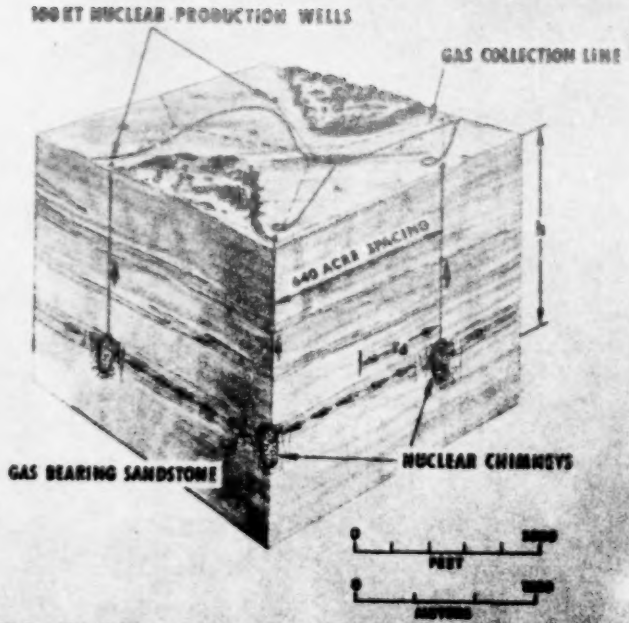
The predictions made before the Gasbuggy explosion indicated that several radionuclides would be present in the gas after the explosion - including krypton-85, iodine-131, and tritium. Measurements to determine the amount of tritium are important in assessing the public health and safety aspects of this experiment. However, the samples of gas collected and measured to date at the Gasbuggy site have shown only that xenon-133 is present. The presence of xenon is not unexpected, and its short radio-active half-life of about five days means that it would not be of significance in future applications.

On-site instruments used for these radioactivity measurements are designed primarily to assure the health and safety of the workers at the site. They are not designed to perform detailed analyses to identify very small quantities of krypton or tritium. Samples of natural gas have been flown to Lawrence Radiation Laboratory at Livermore, California, for detailed analyses, to investigate the presence of these and other nuclides. The results of these analyses are not expected to be known for several months.

Scientists working on this project point out that the most important information to be obtained from the Gasbuggy experiment -- on radioactivity, gas flow increases related to fracturing, gas pressure, and gas production testing -- will be gathered and analyzed during the coming year, after which it will be possible to draw firm conclusions about the results of the experiment.

In the attached figure, the larger drawing at the right shows schematically the chimney, or column of crushed rock, and attendant fracturing, resulting from the use of a nuclear explosive used for the stimulation of gas production. The smaller drawing at the left shows in idealized form how nuclear explosives might be used for actual gas production in a gas bearing field.

GAS RESERVOIR STIMULATION



W.P. = LOCATION OF EXPLOSIVE
R_c = CAVITY RADIUS
r_f = FRACTURE RADIUS
r_d = RADIUS OF DRAINAGE
H = HEIGHT OF CHIMNEY
h = DEPTH OF BURIAL